CLAIMS

1. A power transformer/reactor comprising at least one winding (1, 2, 3) **characterized** in that the winding/windings (1, 2, 3) are manufactured with a high voltage cable (10), comprising an electric conductor, around the conductor there being arranged a first semiconducting layer (14), around the first semiconducting layer (14) there being arranged a first insulating layer (16) and around the first insulating layer (16) there being arranged a second semiconducting layer (18), whereby the second semiconducting layer (18) is directly earthed (32, 34) at n points of each winding (1, 2, 3), where n is an integral number and $n \geq 2$, and whereby two (32, 34) of said n directly earthed points are arranged at or in the vicinity of both ends of each winding (1, 2, 3), whereby the electric contact is interrupted (20) $2(n-1)$ number of times between both ends in the second semiconducting layer (18) , whereby the second semiconducting layers (18) of different phases (1, 2, 3) at each said interruption (20) is earthed in a cross-connected manner (42, 44).

2. A power transformer/reactor according to claim 1, **characterized** in that at least one point (36, 38) between both ends is indirectly earthed (40).

3. A power transformer/reactor according to claim 1, **characterized** in that at each said interruption (20) in the second semiconducting layer (18) there is arranged a third semiconducting layer (26) in order to reduce the amplification of the electric field strength at said interruption (20),

4. A power transformer/reactor according to any one of claims 1-3, **characterized** in that the electric contact in the second semiconducting layers (18) are interrupted in that the second semiconducting layer (18) being removed around the periphery of the high voltage cable (10) down to the first insulating layer (16) so that grooves (20) surrounded by the second semiconducting layer (18) are formed.

5. A power transformer/reactor according to claim 4, **charact rized** in that the second insulating layer (24) is arranged onto each groove (20), besides which the layer (24) covers a part of the second semiconducting layer (18) on both sides of

each groove (20), and that the third semiconducting layer (26) is arranged at the second insulating layer (24), whereby the one end of the third semiconducting layer (26) covers the one edge of the second insulating layer (24) and has electric contact to the second semiconducting layer (18), and that the other end of the third semiconducting layer (26) does not cover the other edge of the second insulating layer (24) but extends along part of the second semiconducting layer (18) located under the second insulating layer (24).

6. A power transformer/reactor according to claim 5, **characterized** in that the edges of the second semiconducting layer (18) at said grooves (20) slope in such a way that the grooves (20) have the least width at the first insulating layer (16).

7. A power transformer/reactor according to claim 6, **characterized** in that the third semiconducting layer (26) at the end covering the edge of the second insulating layer (24) has mechanical contact with the second semiconducting layer (18), and that the other end of the third semiconducting layer (26) does not have mechanical or electric contact with the second semiconducting layer (18).

8. A power transformer/reactor according to any one of claims 1 - 7, **characterized** in that the high voltage cable (10) is manufactured having a conductor area which is between 80 and 3000 mm^2 and an outer cable diameter which is between 20 and 250 mm.

9. A power transformer/reactor according to any one of claims 1 - 8, **characterized** in that there are two interruptions (20) between two consecutive direct earthing points (32, 34)

10. A power transformer/reactor according to any one of claims 1 - 8, **characterized** in that each cross-connected earthing is formed by the second semiconducting layers (18) of the different phases (1, 2, 3) at each said interruption (20) being connected and indirectly earthed (40).

11. A power transformer/reactor according to claim 10, **characterized** in that there are 2(n−1) number of interruptions (20_{11}, 20_{12}; 20_{21}, 20_{22}; 20_{31}, 20_{32}) per phase and thus 3(n−1) connected sections of the second semiconducting layer (18_{11}, 18_{12}, 18_{13}; 18_{21}, 18_{22}, 18_{23}; 18_{31}, 18_{32}, 18_{33}) per phase, and that also at interruption (20) number q, where $1 \le q \le 2(n-1)$, of the different phases (1, 2, 3) section r, where $1 \le r \le 3(n-1)$, of the second semiconducting layer (18) of one phase (1; 2; 3) is connected to section (r+1) of the second semiconducting layer (18) of the consecutive phase, and that section r of the second semiconducting layer (18) of the first phase (1) is connected to section r of the second semiconducting layer (18) of the remaining phases (2, 3), and that section r of the second semiconducting layer (18) of the last phase (3) and section (r+1) of the second semiconducting layer (18) of the first phase (1) are connected to the indirect earthing (40), whereby the aforementioned does not apply to r evenly divisible by 3, except for the last section, i. e. r=3(n-1).

a

12. A power transformer/reactor according to any one of claims 1 - 11, **characterized** in that the direct earthing (32, 34) is performed by means of galvanic connection to earth.

13. A power transformer/reactor according to any one of claims 1 - 12, **characterized** in that the indirect earthing is performed by means of a capacitor which is connected between the second semiconducting layer (18) and earth.

14. A power transformer/reactor according to any one of claims 1 - 12, **characterized** in that the indirect earthing is performed by means of an element, connected between the second semiconducting layer (18) and earth, having a non-linear voltage-current characteristic.

15. A power transformer/reactor according to any one of claims 1 - 12, **characterized** in that the indirect earthing is performed by means a circuit (50) comprising an element, connected between the second semiconducting layer (18) and earth, having a non-linear voltage-current characteristic (52) connected in parallel with a ~~capacitor (54).~~

16. A power transformer/reactor according to claim 15, **characterized** in that the indirect earthings are performed by means of a combination of alternatives according to claims 13 - 15.

17. A power transformer/reactor according to any one of claims 14 - 16, **characterized** in that the element (52) having a non-linear voltage-current characteristic may be designed with a spark gap (52), a gas-filled gas diode, a zener-diode (56) or a varistor.

18. A power transformer/reactor according to any one of claims 1 - 17, **charac- t rized** in that the power transformer/reactor comprises a magnetizable core.

19. A power transformer/reactor according to any one of claims 1 - 17, **characterized** in that the power transformer/reactor is manufactured without a magnetizable core.

20. A power transformer/reactor according to any one of claims 1 - 19, **characterized** in that said layers (14, 16, 18) are arranged to adhere to one another even when the cable is bent.

21. A method for adjusting a high voltage cable (10) for windings in a power transformer/reactor which high voltage cable (10) comprises an electric conductor, around which there is arranged a first semiconducting layer (14), around the first semiconducting layer (14) there is arranged a first insulating layer (16), and around the first insulating layer (16) there is arranged a second semiconducting layer (18), which method comprises the following steps:

- to directly earth (32, 34) the second semiconducting layer (18) at n points of each winding (1, 2, 3), where n is an integral number and n≥2, and whereby two (32, 34) of said n points are arranged at or in the vicinity of both ends of each winding (1, 2, 3);
- to achieve two interruptions (20) between each pair of directly earthed points in the electric contact in the second semiconducting layer (18); and

- to earth in cross-connected manner the second semiconducting layer (18) of the different phases (1, 2, 3) at each said interruption (20);

22. A method according to claim 21, **characterized** in that said method comprises furthermore the step:

- to indirectly earth at least one point (36, 38) in each phase between both ends of the second semiconducting layer (18).

23. A method according to any one of claims 21 - 22, **characterized** in that said method comprises furthermore the step:

- to apply a third semiconducting layer (26) at each said interruption (20) in the second semiconducting layer (18) in order to reduce the amplification of the electric field strength at said interruption (20).

24. A method according to any one of claims 21 - 23, **characterized** in that each said interruption (20) is achieved by removing the second semiconducting layer (18) around the periphery of the high voltage cable (10) down to the first insulating layer (16) so that grooves (20) surrounded by the second semiconducting layer (18) are formed.

25. A method according to claim 24, **characterized** in that the step of applying said means (24, 26) comprises the following steps:

- to apply a second insulating layer (24) over each groove (20) in such a way that part of the second semiconducting layer is (18) on both sides of each groove (20) is additionally covered; and
- to apply a third semiconducting layer (26) on the second insulating layer (24) in such a way that the one end of the third semiconducting layer (26) covers the one edge of the second insulating layer (24) and has electric contact to the second semiconducting layer (18), and the other end of the third semiconducting layer (18) does not cover the other edge of the second insulating layer (24) but extends along a part of the second semiconducting layer (18) located under the second insulating layer (24).

26. A method according to any one of claims 21 - 25, **characterized** in that the step to earth in cross-connected manner comprises the following step:

- to connect the second semiconducting layer of the different phases (1, 2, 3) at each said interruption (20), and indirectly earthing the aforementioned.

27. A method according to claim 26, **characterized** in that the step to earth in cross-connected manner comprises furthermore the following steps; whereby the number of interruptions (20_{11}, 20_{12}; 20_{21}, 20_{22}, 20_{31}, 20_{32}) per phase are 2(n-1) and the number of connected sections of the second semiconducting layer (18_{11}, 18_{12}, 18_{13}; 18_{21}, 18_{22}, 18_{23}; 18_{31}, 18_{32}, 18_{33}) per phase are 3(n−1):

- to connect at interruption (20) number q, where $1 \le q \le 2(n-1)$, of the different phases (1, 2, 3), section r, where $1 \le r \le 3(n-1)$, of the second semiconducting layer (18) of one phase (1, 2, 3) to section (r+1) of the second semiconducting layer of the consecutive phase;
- to connect section r of the second semiconducting layer (18) of the first phase (1) to section r of the second semiconducting layer (18) of the remaining phases (2, 3); and
- to connect section r of the second semiconducting layer (18) of the last phase (3) and section (r+1) of the second semiconducting layer (18) of the first phase (1) to the indirect earthing (40), whereby the aforementioned does not apply to section r, where r is evenly divisible by 3, except for the last section, i. e. r=3(n−1).